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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.	
10/628,454	07/29/2003	Kyesan Lee	240872US2	4837	
22850	7590	06/21/2007	EXAMINER		
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.			PORTIS, SHANTELL L		
1940 DUKE STREET		ART UNIT		PAPER NUMBER	
ALEXANDRIA, VA 22314		2617			
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/628,454	LEE ET AL.	
	Examiner	Art Unit	
	Shantell Portis	2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 19 March 2007.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-19 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 29 July 2003 is/are: a) accepted or b) objected to by the Examiner. Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a). Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) Notice of Informal Patent Application
- 6) Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed on March 19, 2007 have been fully considered but they are not persuasive. Applicant argues that *Paulraj teaching of CDMA, as well as TDMA and FDMA, relate to a standard single carrier scheme*. Paulraj discloses BTS 12 sending transmit signals TS to all receive units 14 via channels 22A and 22B. Further disclosing, other approaches including the use of multi-carrier techniques. The communication system can be based on any multiple access technique including TDMA, FDMA, CDMA and OFDMA. (Col. 5, lines 11-14; Col. 5, lines 59-66; Col. 7, lines 30-32 and Col. 12, lines 11-12).

Applicant argues, "*there are no teachings or suggestions in Paulraj of implementing the suggested Space-Time Coding with the MC-CDMA scheme.*" The examiner disagrees. Paulraj discloses a Space-Time Coder 65 and Space-Time Decoder 88 as shown in Figures 3 and 4. (Also, Col. 3, lines 63-64; Col. 7, lines 12-32 and Col. 9, lines 52-57).

Applicant argues that *Paulraj relate to providing transmit signals assigned to different antennas, not to mapping output signals "to signal points on a conjugate plane."* Col. 9, lines 1-13 teaches the S-T Coding Unit 66 in conjunction with transmit processing unit 72 operating on the K spatial multiplexed streams to form an antenna mapping unit which maps streams (output signals) to transmit antennas.

In regards to the de-mapping means of claims 5 and 11, Col. 10, lines 40-42 teaches the streams are reconstructed (de-mapped) and converted to a serial stream by

parallel to serial converter 96. Also, the streams were mapped after converting from serial to parallel; it is inherent for the streams to be de-mapped in order for converting back to serial.

Figure 3 shows a transmit unit 50 and Figure 4 shows a corresponding receiver 80 for receiving signals transmitted from transmit unit 50. The system can be based on any multiple access technique including TDMA, FDMA, CDMA and OFDMA in that Figures 6 and 7 show a modified transmit unit 50 and receiver unit 80 to operate in an OFDM system. According to Figures 3 and 6, the modification occurs at the transmitting process G (z) 72 before further transmitting the signals from antennas TA. (Col. 12, lines 11-24). According to Figures 4 and 7, the modification occurs between the RA receiving the signals, further where signals are passed through the S-F matrix channel estimator and then to the receive processing block 132. From there, the processing of the receive signals proceeds as in receive unit 80. (Col. 12, lines 25-35). Thus, Figures 3 and 6 & Figures 4 and 7 are combined and disclose the limitations as claimed in claims 1, 5 and 11.

In regards to claims 1 and 11, “***a plurality of multicarrier CDMA transmit means for respectively copying in parallel output signals from said Nc/SF space time transmit diversity encoding means to SF signals***”, Paulraj teaches a plurality of multicarrier CDMA transmit means for copying in parallel (serial-to-parallel converter 120) output signals from encoding means (Space-Time Coding unit 66). (Col. 7, lines 11-31; Col. 12, lines 11-24 and Figures 3 & 6).

The rejections for claims 1, 5 and 11 are maintained for the reasons set forth above, therefore this action is made **FINAL**. The examiner maintains the rejections for claims 1-19 as further set forth below.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 3-5, 7-11, 13, 14 and 16-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Paulraj et al. (Paulraj), U.S. Patent No. 6,351,499.

Regarding Claims 1, 3, 11 and 13, Paulraj discloses a transmitter device (50) adopting space time transmit diversity multicarrier CDMA scheme, comprising: an encoding interleaving means (56) for encoding transmit data by performing error correction and for interleaving the encoded data (**Col. 6, lines 50-65 and Figure 3**); a mapping means for mapping output signals from said encoding interleaving means to signal points on a conjugate plane (**Col. 9, lines 1-13**); a serial to parallel conversion means (120) for converting output signals from said mapping means into Nc/SF parallel signals, where Nc is an integer representing the number of points of inverse fast Fourier transform and SF is an integer and a submultiple of Nc (**Col. 12, lines 11-24 and Figure 6**); Nc/SF space time transmit diversity encoding means for encoding in time direction and in space direction the parallel signals from said serial to parallel

conversion means (**Col. 7, lines 12-19 and Figure 3**); a plurality of multicarrier CDMA transmit means for respectively copying in parallel output signals from said Nc/SF space time transmit diversity encoding means to SF signals (**Col. 7, lines 11-31; Col. 12, lines 11-24 and Figures 3 & 6**), for respectively spreading copied signals, for respectively performing inverse fast Fourier transform (**122**) of Nc points with respect to spread signals, and for respectively converting transformed parallel signals into serial signals (**124**) (**Col. 12, lines 11-24 and Figure 6**); and a plurality of transmit antennas (**TA**) for respectively transmitting output signals from said plurality of multicarrier CDMA transmit means (**Figures 3 & 6**).

Regarding Claims 4, 10, 14 and 19, Paulraj discloses wherein said spreading codes are Walsh Hadamard codes (**inherent in a CDMA or OFDMA network**).

Regarding Claims 5, 8, 11 and 17, Paulraj discloses a receiver device (**80**) adopting space time transmit diversity multicarrier CDMA scheme, comprising: a plurality of receive antennas (**RA**)(**Figure 4**); a plurality of multicarrier CDMA receive means for respectively converting received signals from said plurality of receive antennas into parallel signals (**126**), for respectively performing fast Fourier transform (**128**) of the converted parallel signals, for respectively inversely spreading transformed signals, and for respectively equalizing and combining inversely spread signals (**Col. 12, lines 25-35 and Figure 7**); space time transmit diversity decoding means (**88**) for decoding in time direction and in space direction output signals from said plurality of multicarrier CDMA receive means (**Col. 9, lines 52-57 and Figure 4**); a parallel to serial conversion means (**96**) for converting output signals from space time transmit

diversity decoding means into serial signals (**Col. 10, lines 40-46 and Figure 4**); a de-mapping means (**Col. 10, lines 40-42**) for de-mapping output serial signals from said parallel to serial conversion means; and a decoding de-interleaving means (**98**) for de-interleaving output signals from said de-mapping means and for decoding de-interleaved data by performing error correction (**Col. 10, lines 40-46 and Figure 4**).

Regarding Claims 7, 8, 16 and 17, Paulraj discloses wherein each of said plurality of multicarrier CDMA receiver means further comprises means for estimating channel (**130**) for respective subcarriers, and means for respectively equalizing and combining the inversely spread signals in accordance with estimated channels (**Figure 7**).

Regarding Claims 9 and 18, Paulraj discloses wherein each of said plurality of multicarrier CDMA receiver means further comprises an estimated value combiner means for combining channel estimated values from said channel estimator means, and wherein said space time transmit diversity decoding means decode output signals from said plurality of multicarrier CDMA receive means by using combined channel estimated values from said estimated value combiner means (**Col. 9, lines 52-57 and Figures 4 & 7**).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made

to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 2, 3, 6, 8, 12, 13, 15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Paulraj in view of Hadad, U.S. Patent No. 7,133,352.

Regarding Claims 2, 3, 6, 8, 12, 13, 15 and 17, Paulraj discloses the transmitter device, receiver device and wireless communication system as claimed in claims 1, 5 and 11 as described above.

Paulraj fails to disclose wherein said plurality of multicarrier CDMA transmit and receiver means comprise means for adding guard intervals to the serial signals and removing guard intervals from the received signals, respectively.

In a similar field of endeavor, Hadad discloses a bi-directional communication channel. Hadad further discloses wherein said plurality of multicarrier CDMA transmit and receiver means comprise means for adding guard intervals to the serial signals (**Col. 9, lines 30-45**) and removing guard intervals from the received signals (**inherent when added to the signal at the transmit side**), respectively.

At the time of the invention, it would have been obvious to a person of ordinary skill in the art to decrease the multipath effect (**Col. 9, line 47**).

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shantell Portis whose telephone number is 571-272-0886. The examiner can normally be reached on Monday-Friday 7:00am-3:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lester Kincaid can be reached on 571-272-7922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

WLP

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